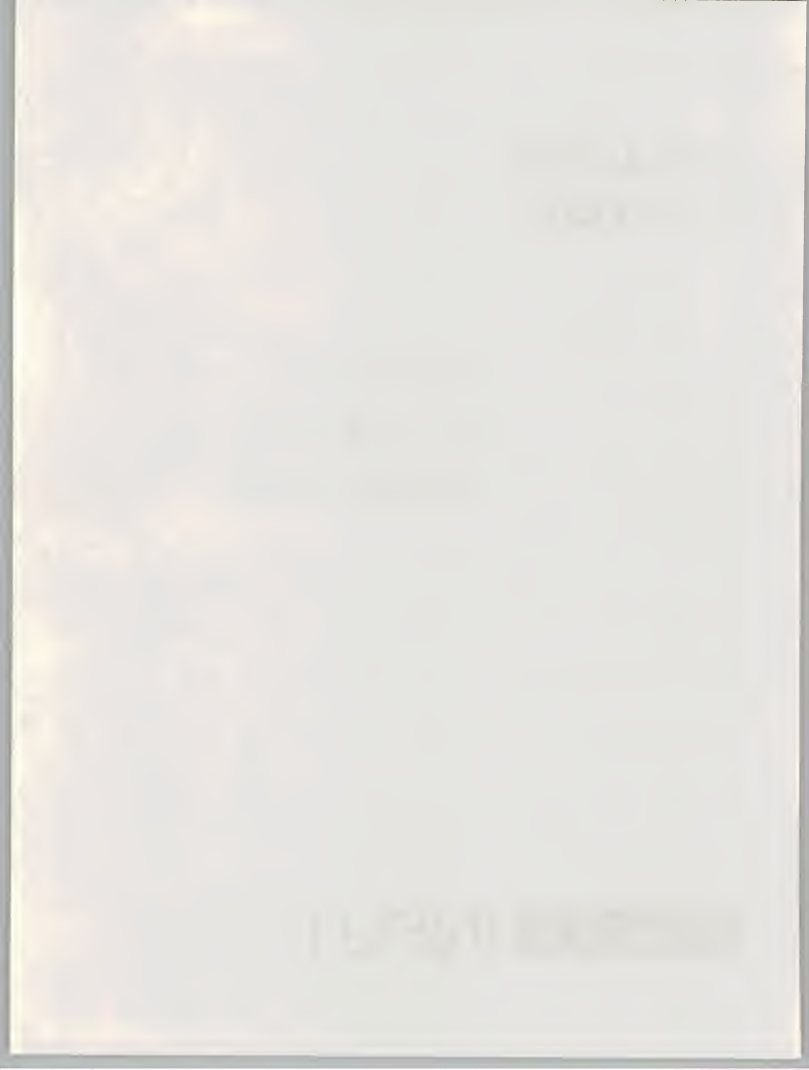


# Executive Overview

## Network Services Directions

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## About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs.

Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technically advanced companies.

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To Our Clients:

This summary is an excerpt from a full research report, Network Services Directions, issued as part of INPUT's Information Systems Program (ISP). A complete description of the program is provided at the end of this Executive Overview.

If you have questions or comments about this report, please call INPUT at (415) 960-3990 and ask for the Client Hotline.



## REPORT ABSTRACT

This report, produced as part of INPUT's Information Services Planning (ISP) Program, takes a comprehensive look at network services directions. It includes a technology scan and analysis of networking techniques, profiles of leading and innovative vendors, descriptions of user attitudes toward network services, and discussions of the applications which are now important and those which will likely become more important in the future.

The voice/data/image traffic split is quantified now and in 1991, and user directions toward private and virtual private networks are tracked.

Several case studies describe users' approaches to network services. The report concludes with detailed recommendations to users of network services.

## OVERVIEW CONTENTS

Users Were Confused .....	1
Users Are Experimenting .....	3
The Network Application Mix Is Changing .....	5
The Market Is Consolidating .....	7
The Network Services Market Is Growing .....	9
Toward Adaptive Network Service Technologies .....	11
Recommendations to Network Service Users .....	13
Table of Report Contents .....	16
List of Report Exhibits.....	24
Program Description.....	26

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# ORIGINAL ARTICLES

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2. The Effect of the Diet on the Blood Sugar in the Normal Adult . . . . . 1

3. The Effect of the Diet on the Blood Sugar in the Normal Adult . . . . . 1

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#### A. USERS WERE CONFUSED

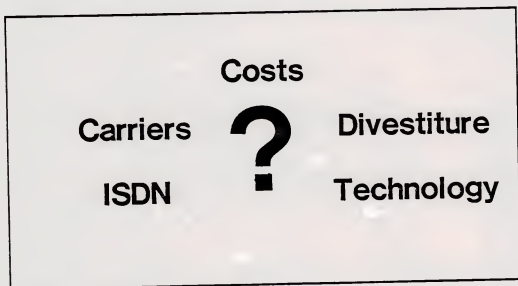
- The convergence of computers and communications is now upon us.
- Whereas the previous focus was on computing, there is more attention now being paid to the communications aspects of the information dyad. This takes the form of:
  - Internal communications, within and among work groups, between geographically distributed divisions, and among communities of interest.
  - External communications, with trading partners and, in some cases, with government regulatory agencies or trade associations.
- With the divestiture of AT&T and the end to one-stop shopping for communications needs, users were faced with a confusing environment and many remain confused. The causes include:
  - The rise of new carriers and new services.
  - Deregulation leading to competitive market forces.
  - The complexities of international communications.
  - Developing technologies.
  - Changing tariff and pricing structures.
  - Evolving, and sometimes competing, standards, such as the Integrated Services Digital Network.
- Users are aware that processing costs are decreasing while communications costs rise. They want more control of network expenses.

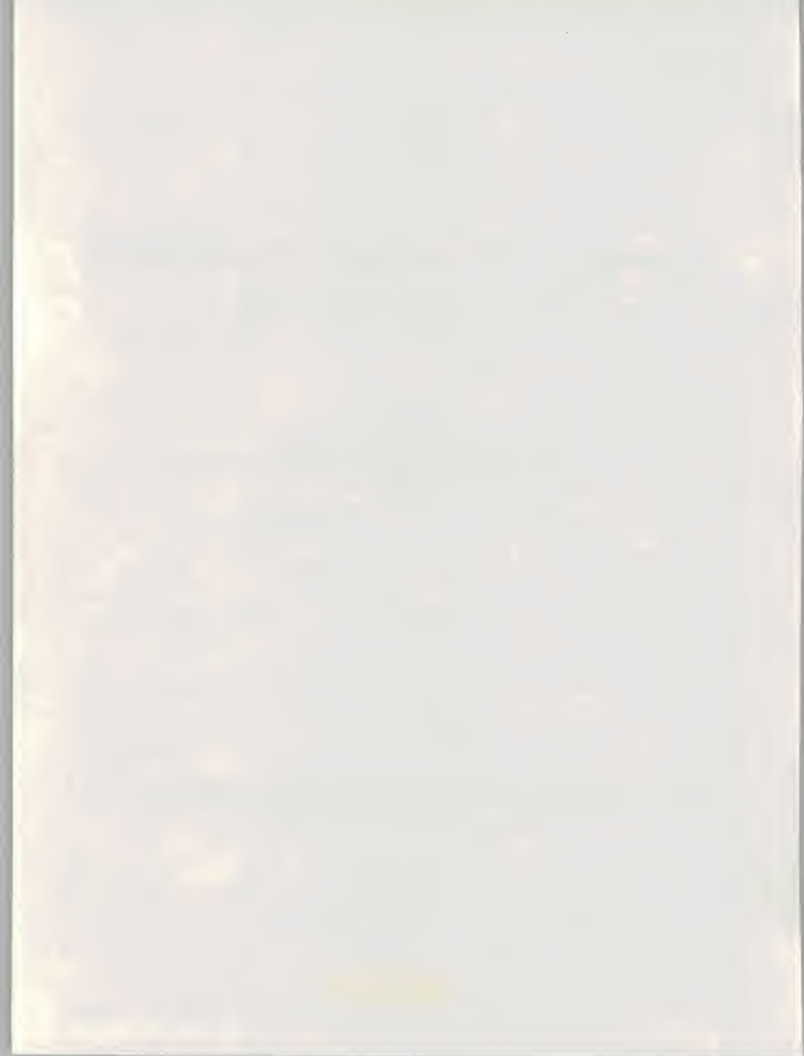


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## USERS WERE CONFUSED





## B. USERS ARE EXPERIMENTING

- While the dust has yet to settle from AT&T's divestiture, users are coming to terms with the new communications environment. They are aware of new options and many are experimenting with alternative approaches to needed network services.
- Many users are implementing private networks. The "Be Your Own Bell" strategy is more than a fad; it is driven largely by users wanting independence from network service vendors and more cost control. Another factor is their frustration due to long delays in getting needed services.
- In addition to hybrid networks combining private and public networks, new "virtual" private and software-defined networks afford both user control and the economies of a shared backbone network. These are being viewed favorably.
- Bypass methods such as microwave Digital Termination Services (DTS), satellite services using flexible small dishes (VSAT), lightwave systems, and cable television (CATV) data services are also available.
- Additionally, new networks such as fiber optic services are evolving, offering economical, wideband capabilities to users needing and able to manage the bulk capacity services now provided.
- Over the horizon is the Integrated Services Digital Network (ISDN) which will provide universal service using standard interfaces and access schemes.

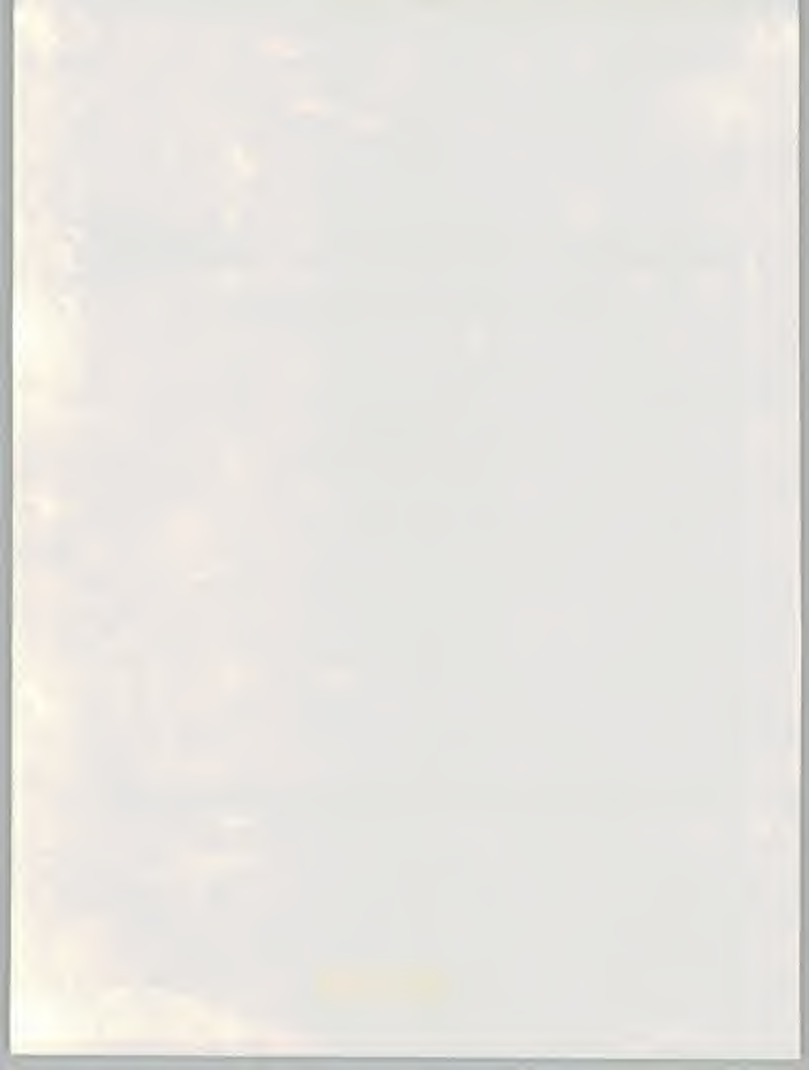


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## USERS ARE EXPERIMENTING

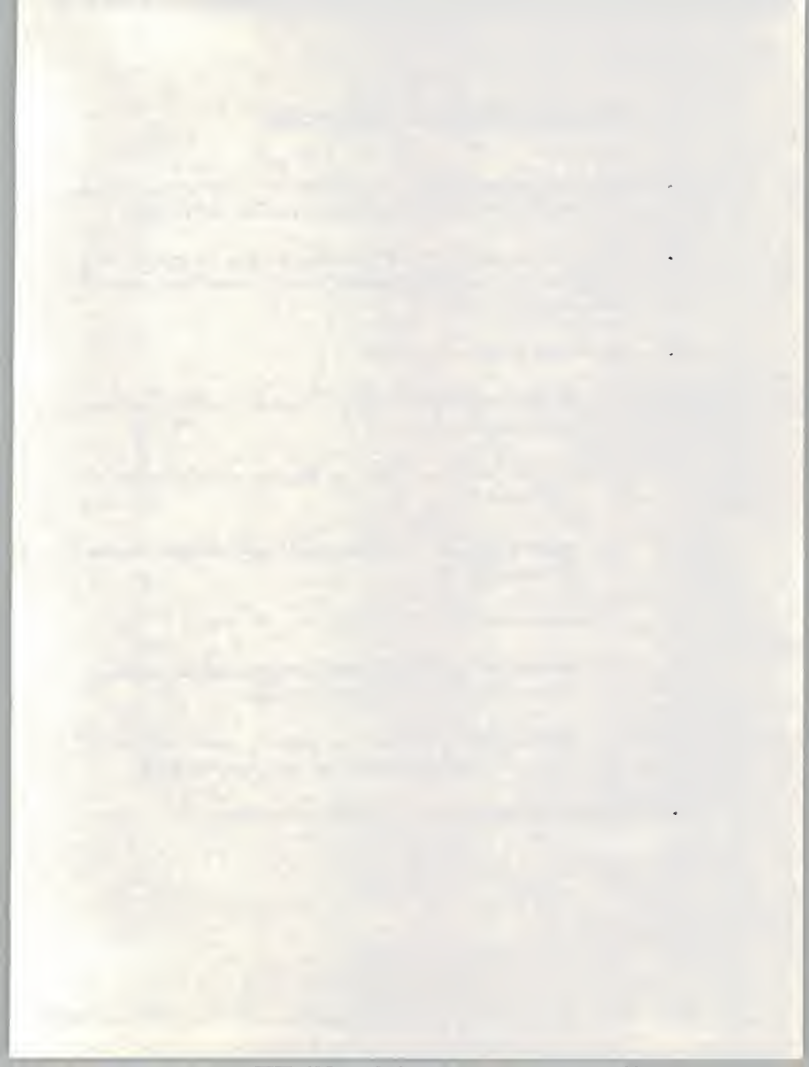
- "Be Your Own Bell"
  - Hybrid Networks
  - Virtual Private Networks
  - Bypass Options
- ISDN





### C. THE NETWORK APPLICATION MIX IS CHANGING

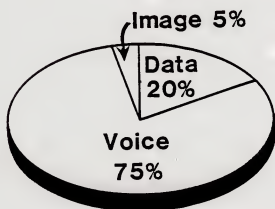
- Voice, time sharing, and data base access remain the dominant applications tied to network services. However, new services are now being offered.
- Network services providing "pure" communications links are often viewed as commodities. The applications available through a network is an important factor in vendor selection.
- Important applications will likely be:
  - Electronic data interchange, the exchange of business documents between trading partners.
  - Electronic mail, particularly as universal access standards are implemented.
  - Graphic systems such as linked computer assisted design and engineering workstations.
  - Teleconferencing in voice, video, and computer modes.
  - New consumer-oriented applications such as point-of-sales, credit card authorizations, and, in the longer term, videotex.
  - Additional business and consumer telemetry applications such as alarms, meter reading, and remote equipment fault diagnostics.
- The net result is that data will become a larger part of the mix.



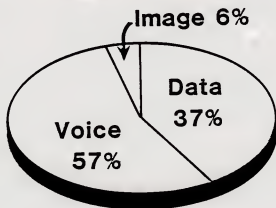
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**THE NETWORK APPLICATION MIX IS CHANGING**  
**User Estimates**



**1986**



**1991**



#### D. THE MARKET IS CONSOLIDATING

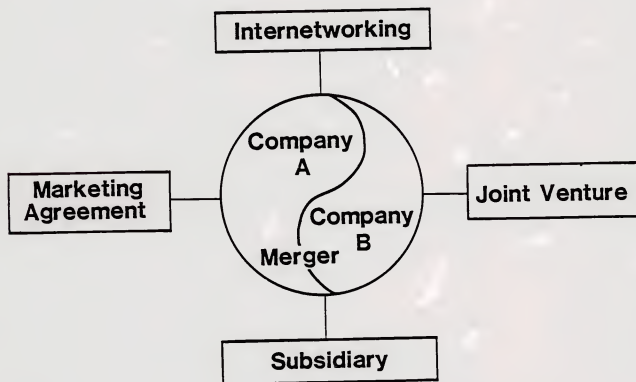
- Whereas the intent of divestiture and deregulation is to encourage competition, leading to cost and technological innovation benefits for users, it now appears the costs of competition on vendors is leading to a different environment.
- Examples of consolidation can be regularly read in the business pages of local newspapers. They include:
  - The merger of U.S. Telecom and GTE Sprint to form U.S. Sprint, combining now separate voice and data networks.
  - The purchase of RCA by General Electric, combining data communications services.
  - The purchase by British Telecom of an ITT division.
  - The partial ownership of MCI by IBM.
- Additionally, there are many examples of strategic partnering represented by joint ventures, marketing agreements, and internetworking which may be a prelude to more formal, future bonding.
- These amalgamations may mean the eventual return of communications monopolies; however, a more likely scenario is an oligopoly of a few major companies with the actions of each affecting the others.
- In the interim, constellations of communications companies are developing, linked formally or informally, to provide end-to-end services and often equipment to users.

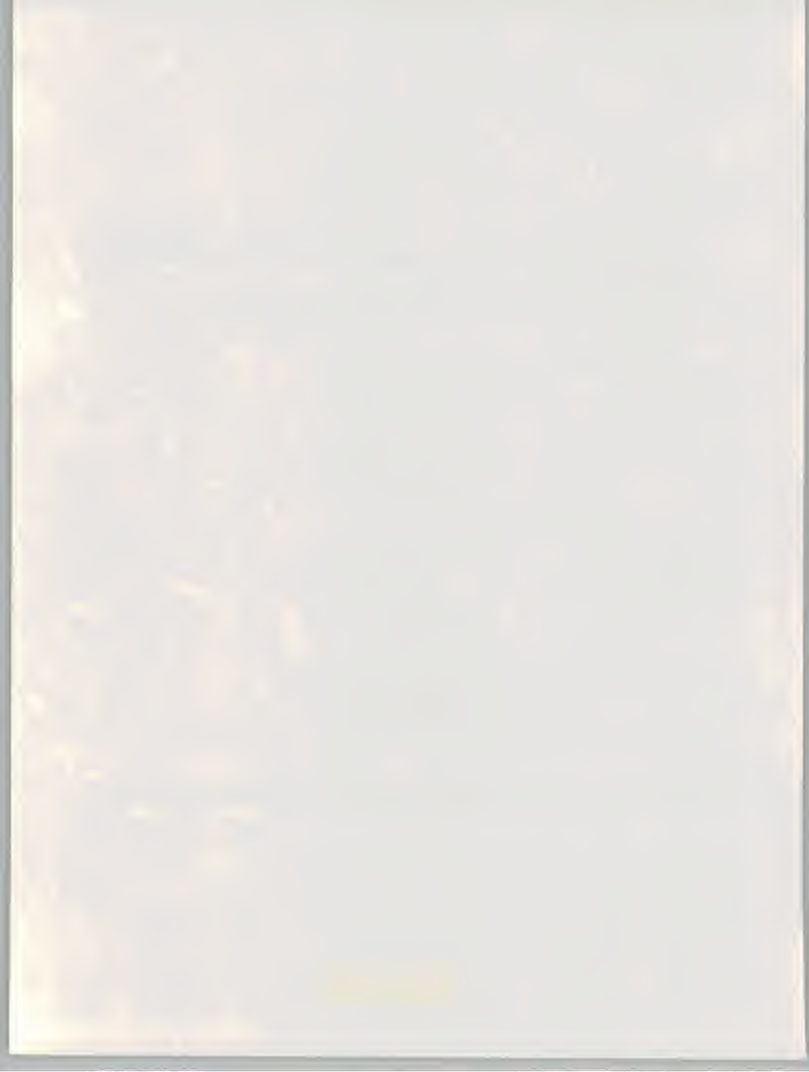


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## THE MARKET IS CONSOLIDATING







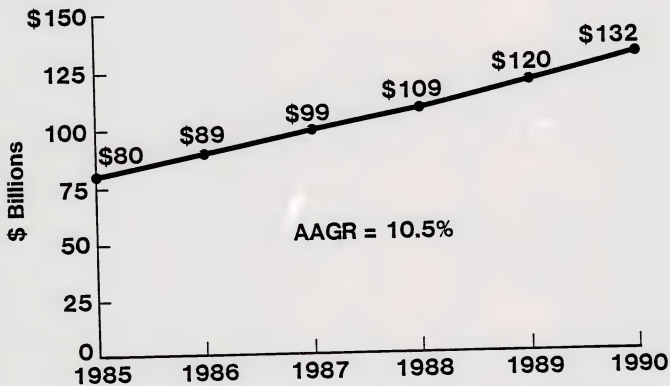
#### E. THE NETWORK SERVICES MARKET IS GROWING

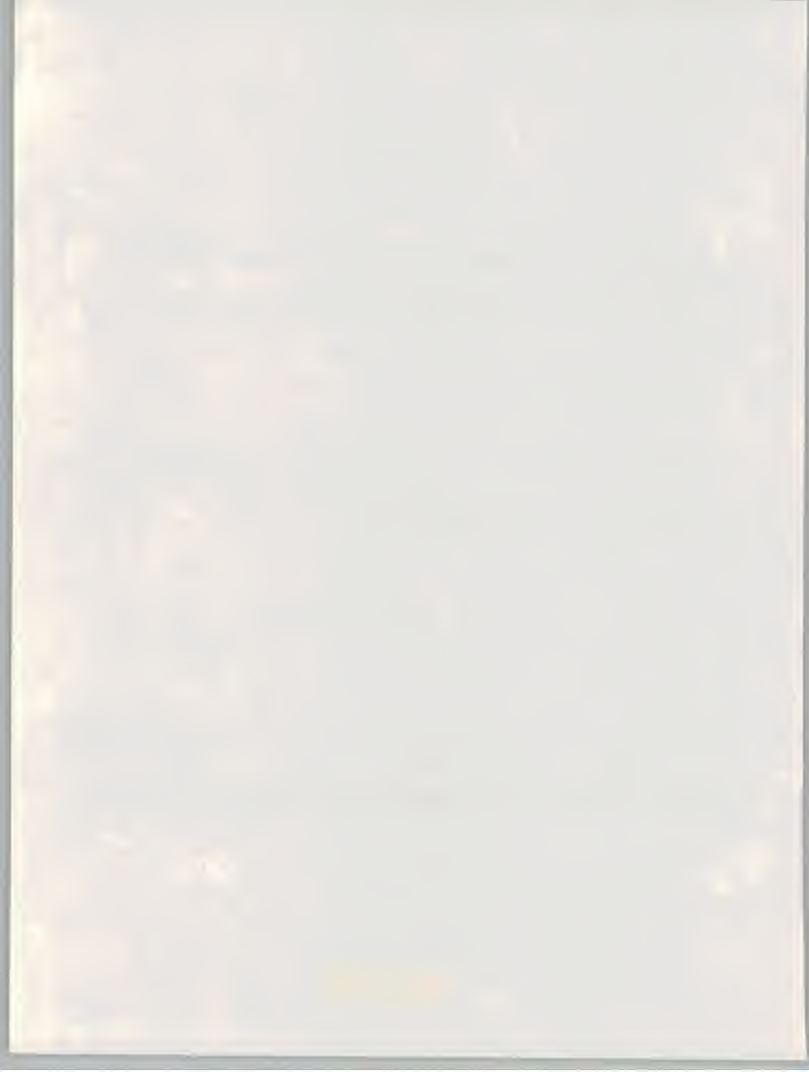
- A healthy economy and growing awareness of the benefits of telecommunications mean continued growth in the network services industry as a whole.
- Data communications, now representing approximately 20% of corporate network service traffic, will increase. These increases are tied to:
  - The acceptance of microcomputers in business and the demand to link these tools to other processors.
  - The importance of information in the modern age.
  - Increasing activity on a multi-national level.
  - New applications.
- While the proportion of voice traffic will decrease, it too will continue to grow in the 10% range.
- INPUT estimates the 1985 market for network services (voice and data) at \$80 billion, growing at an average annual growth rate of approximately 10% to become a \$132 billion market by 1990.



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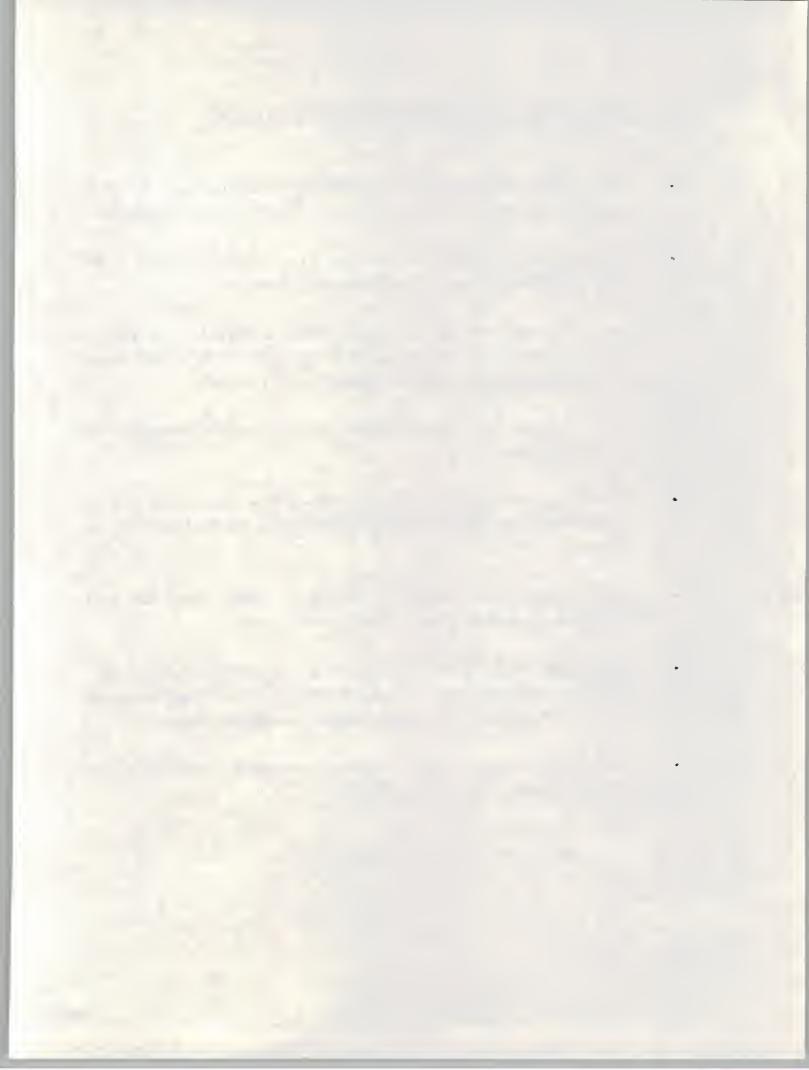
**THE NETWORK SERVICES MARKET IS GROWING  
VOICE AND DATA**





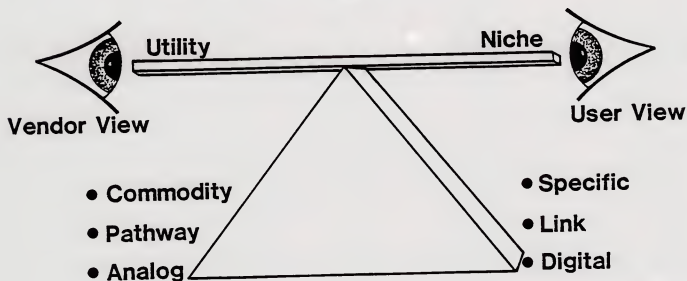
## F. TOWARD ADAPTIVE NETWORK SERVICE TECHNOLOGIES

- While networks have often been optimized for voice, data, image, or various protocols, the evolution of network services is toward adaptive technologies.
- It is useful to consider two conflicting, yet complimentary, views of the generic "network" to further understanding of this concept.
  - The utility view sees networks in their most basic form, providing a commodity pathway between two or more points. This telephony-based view obscures the inherent adaptability of the network.
  - The niche view sees the network as fitting specific user needs and applications.
- The challenge to users and vendors is to balance these views, recognizing the multidimensionality of communications technologies, and to identify how the technology can be customized.
- While vendors want to be all things to all people (utility view), users want customized solutions for their specific needs (niche view).
- The networks of the future will be all digital, using a standard interface for a variety of terminal devices. The digital nature of future networks is highly adaptable: digitized voice and digital data will be indistinguishable.
- The Integrated Services Digital Network, when available, promises to provide a universal solution to individual problems.



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## TOWARD ADAPTIVE NETWORK TECHNOLOGY







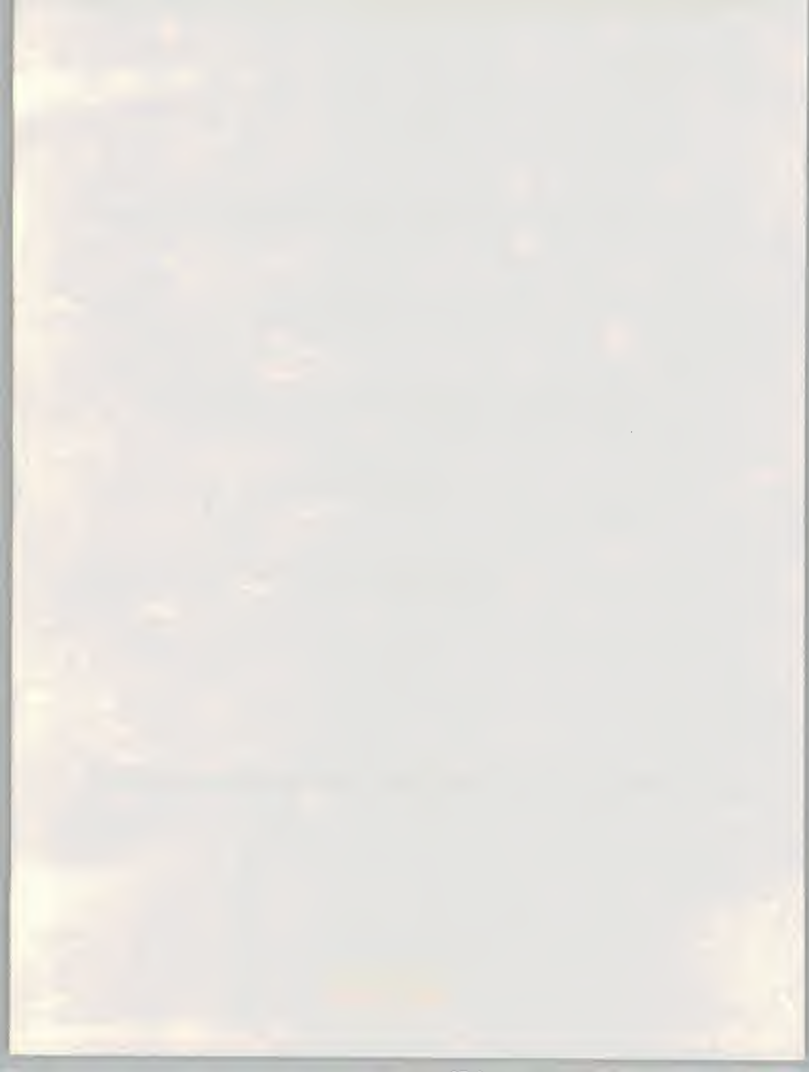
## G. RECOMMENDATIONS TO NETWORK SERVICE USERS

- Users should consider adding technology assessment staff to monitor new developments and make recommendations for piloting new, innovative solutions.
- Users should investigate parallel developments and alternative solutions to problems and avoid the tendency toward the inertia of "comfortable" technologies. To ignore promising trends may mean a loss of competitive advantage and overlooked opportunities.
- Organizationally, the voice and data departments should be merged with cross-discipline training to prepare the way for voice/data integration initiatives in the future.
- Users should evaluate the cost effectiveness of software-defined and virtual private networks as an alternative to private network configurations and develop an organized method of evaluating competitive vendors using a decision matrix.
- ISDN developments should be monitored and management kept informed of both the benefits and risks of ISDN. Use of digital and software-defined networks can provide valuable experience for ISDN. A plan for reusing unneeded equipment when ISDN becomes available should be developed.
- Short-term equipment/service agreements provide flexibility and keep vendors interested in the organization, plus encourage competitive pricing.



## **RECOMMENDATIONS TO NETWORK SERVICE USERS**

- **Add Technology Assessment Staff; Experiment with Innovations; Merge Voice/Data Departments; Cross-Train**
  - **Evaluate Competitive Vendors/Technologies Using a Decision Matrix**
  - **Monitor ISDN and Keep Management Informed**
  - **Stay Flexible With Short-Term Contracts**
-







# NETWORK SERVICES DIRECTIONS

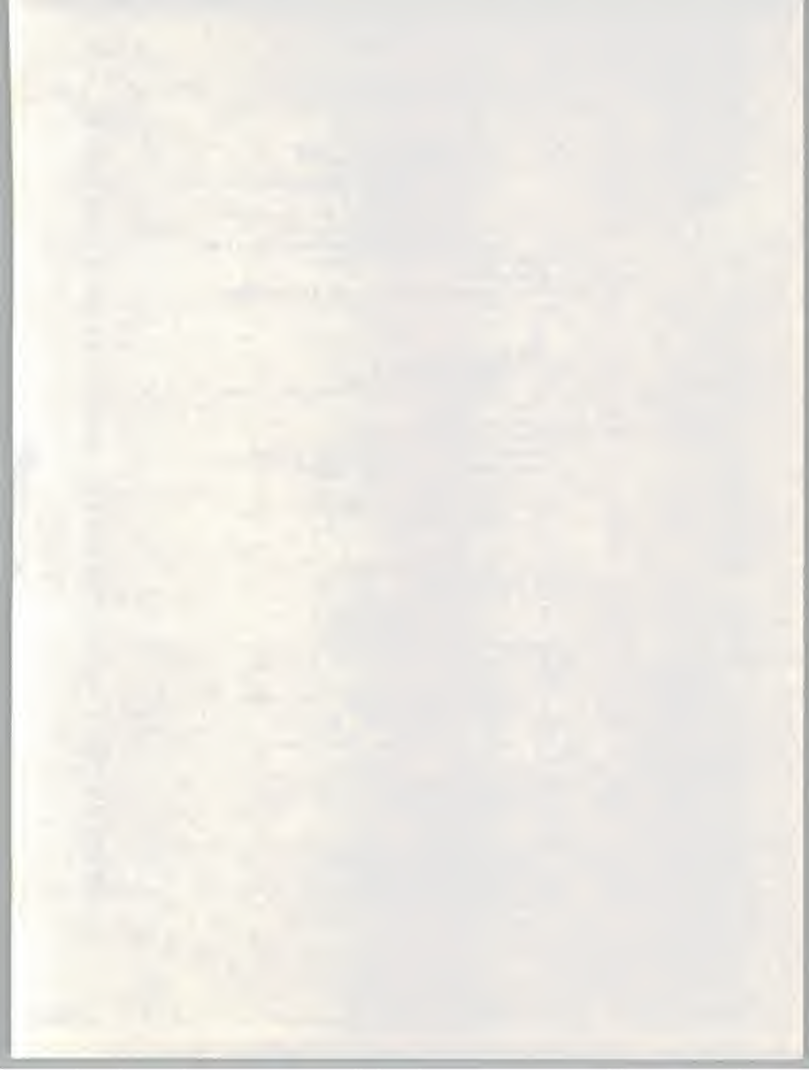
## CONTENTS

	<u>Page</u>
I INTRODUCTION.....	I
A. Background	1
B. Scope	3
C. Methodology	5
D. Purpose	5
E. Related Reports	7
II EXECUTIVE SUMMARY .....	9
A. Users Were Confused	10
B. Users Are Experimenting	12
C. The Network Application Mix Is Changing	14
D. The Market Is Consolidating	16
E. The Network Services Market Is Growing	18
F. Toward Adaptive Network Service Technologies	20
G. Recommendations to Network Service Users	22
III NETWORK SERVICES TECHNOLOGY TRENDS .....	25
A. Intra-LATA Trends	25
1. Bypass	25
2. Local Packet Switching Networks	26
3. Project Victoria	28
4. NEC's Spectrum Diffusion Communication Method	29
5. Microwave and Digital Termination Services	29
a. Microwave Overview	31
b. Digital Termination Service (DTS)	32
6. Centrex Services	33
7. Cable Television (CATV) Voice and Data Services	34
B. Inter-LATA Trends	36
1. 800 Services	36
2. T-1	38
3. Switched 56 Kbps Service	38
4. Satellite Service Directions	39
a. Domestic Satellite Service Directions	39
i. Very Small Aperture Terminals (VSAT)	39
ii. Costs of VSAT Services	41
iii. Tymnet's Tymstar Service	42
b. International Satellite Services	43





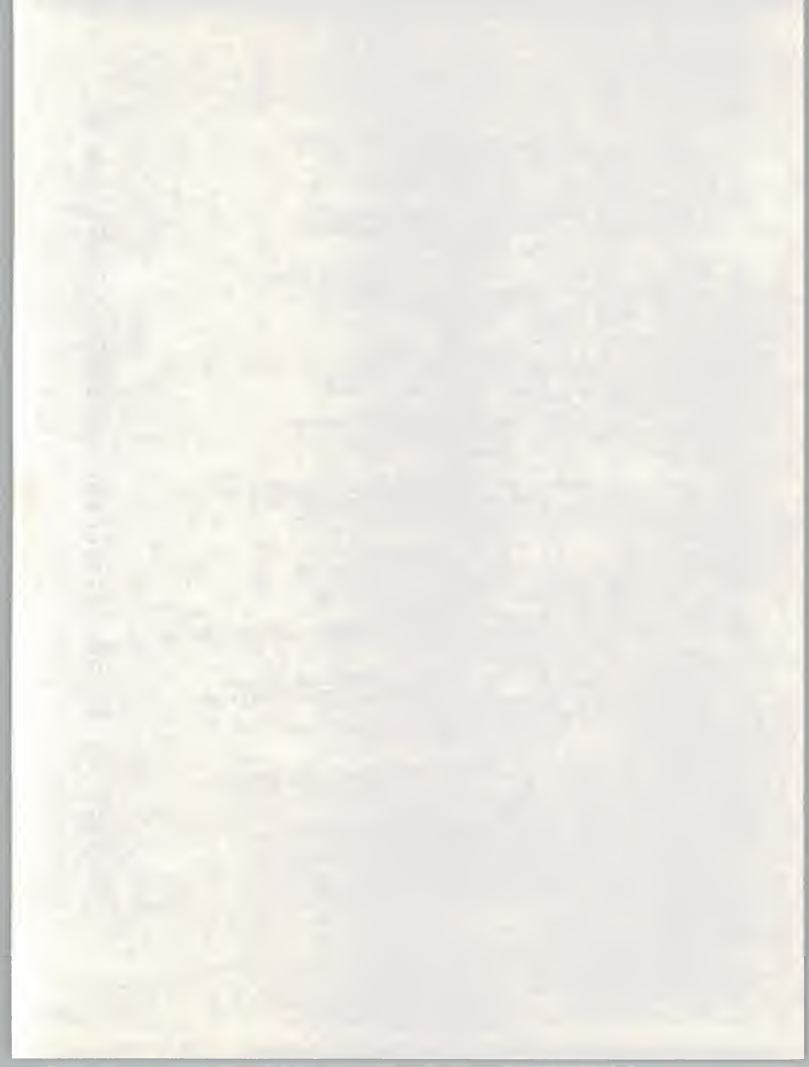
	<u>Page</u>
c. Future Satellite Directions	45
i. Ka Band - Beyond Ku	45
ii. Mobile Satellite Service (MSS) Proposals	46
(a) Overview	46
(b) Controversy and Competition	48
iii. Global Positioning Services	49
iv. Implications for Network Service Users	51
C. Hardware, Interface, and Related Trends	51
1. Faster Modems	51
2. New Communications Protocols Are Emerging	53
a. MNP	53
b. X.PC	54
3. The Corporation for Open Systems	55
4. PBX Directions	57
a. Advanced PBXs	57
b. Computer-to-PBX Interface Alternatives	58
5. Data Compression	58
6. Voice Compression	59
D. Other Network Directions	60
1. Virtual Private/Software Defined Networks	60
2. Integrated Services Digital Network	64
a. Background	64
b. International Complications	66
c. Survey Results	66
d. Why ISDN?	67
e. ISDN Timetable	67
f. Piloting Now Underway	70
g. Pricing Issues	71
h. ISDN Services	71
i. User/Vendor Perspectives	73
j. Vendor Strategies/Standards	74
3. Fiber Optics (FO)	74
a. Overview	74
b. Nontraditional Partners	76
c. Bulk Capacity versus Switched Services	78
d. Fiber in the Local Loop	79
e. User Perspectives	80
f. Fiber Optic Technological Directions	80
g. Analysis	81
4. FM Radio SCA Services	82
a. Background of SCA	82
b. Vendor Services	82
c. Pricing SCA	86
d. Applications	86
5. Vertical Blanking Interval (VBI)	89
a. Background	89
b. International MarketNet	89
6. Packetized Voice	90



	<u>Page</u>
7. Packet Radio	92
a. Amateur Experimentation	92
b. Commercial Applications	92
c. Proposed Public Digital Radio Service	93
IV VENDOR PROFILES .....	97
A. Traditional and Innovative Network Service Vendors	98
1. AT&T	98
a. AT&T Communications	98
b. The Cancellation of AT&T's Net 1000	101
2. Automatic Data Processing, Inc. (ADP)	102
3. CompuServe Incorporated	103
a. Background	103
b. Financials	104
c. Directions	105
4. Computer Sciences Corporation (CSC)	106
a. Background	106
b. Strategy	107
c. Profitability	107
d. Analysis	108
5. DAMA Telecommunications Corporation	108
6. General Electric Information Services Company (GEISCO)	110
a. Background	110
b. Financials	110
c. Strategies	111
7. Globenet	112
8. Graphic Scanning Corporation	113
a. Background	113
b. Financials	114
c. Recent Events	115
d. Analysis	116
9. GTE Telenet Communications Corporation	117
10. Indesys, Inc.	118
11. ITT Corporation	120
a. ITT Corporation - Overview	120
b. ITT Dialcom, Inc.	121
c. ITT World Communications	122
d. U.S. Transmission Systems	122
e. Analysis	122
12. Local Area Telecommunications, Inc. (LOCATE)	123
13. MCI Communications Corporation (MCI)	123
14. McDonnell Douglas Information Systems Group/Tymnet	125
a. Background	125
b. Financials	126
c. Strategies	126
15. TRT Telecommunications	127



	<u>Page</u>
16. Western Union (WU)	128
a. Service Profile	128
b. Financial Problems	129
c. Analysis	131
B. Satellite Network Service Vendors	132
1. American Satellite Company (ASC)	132
a. Background	132
b. Financials	133
2. Financial Satellite Corporation (FINSAT)	133
3. Equatorial Communications	134
a. Background	134
b. Financials	135
c. Strategies	135
4. Mobile Satellite Corporation	136
5. Omnet Corporation	136
6. Private Satellite Network (PSN)	137
7. Skylink Corporation	138
8. Vitalink Communications Corporation	139
a. Background	139
b. Strategies	139
c. Financials	140
C. Ventures Born of Alliances, Mergers, and Partnering	142
1. Electronic Data Systems, Inc. (EDS)	142
a. Background	142
b. Financials	142
c. The GM Acquisition	143
d. EDS' Role in Network Services	143
e. Analysis	144
2. British Telecom/ITT Dialcom, Inc.	144
3. GTE Sprint/U.S. Telecom	145
4. GTE Telenet/Consortium Communications International (CCI)	146
5. IBM/MCI/SBS	147
6. McDonnell Douglas Network Systems Company (Tymnet)/Southern New England Telephone Company	148
7. GE/RCA	148
8. General Electric Information Services Company (GEISCO)/NEC	149
9. Allnet/Lexitel	150
10. Pacific Telesis Group (Pactel)/Communications Industries, Inc.	151
11. Others	151
12. Analysis: More Consolidation Coming	152
13. Types of Alliances	153
D. Equipment Manufacturers' Network Services	154
1. Data General	154
2. Digital Equipment Corporation (DEC)	156



	<u>Page</u>
3. IBM and the Information Network (IN)	156
a. Overview	156
b. Integration Capabilities Need Improvement	158
c. IBM and Network Services	159
i. IBM's Information Network	160
ii. Other Applications	161
d. Analysis	162
4. Wang Laboratories	163
a. Background and Network Services	163
b. Financials	166
c. Strategies/Analysis	166
V MARKET FACTORS, USER TRENDS, AND FORECASTS .....	167
A. User Views, Concerns, and Trends	167
1. Views of Corporate Telecommunications	167
a. Management Perceptions of the Network	168
b. Who Reports to Whom?	168
i. Voice and Data Departments Are Coming Together	168
ii. Decentralization Trends	169
c. The Network Contributes	169
d. Voice/Data Integration	169
e. Local Area Networks (LANs)	170
f. Involving Telecommunications in Planning	170
g. Lack of Telecommunications Policy	170
2. The Challenges Facing Telecom Managers	171
3. User Observed Trends	173
4. What Small Users Want	174
5. What Large Users Want	175
6. User Concerns	175
7. Private versus Public Network Services Directions	177
8. Connecting Remote Offices	180
9. Current and Planned Bypass Activities	182
10. Few Users Resell Excess Capacity	182
11. Shared Networks	184
a. Shared Tenant Services	184
b. Teleports	185
c. Analysis	185
B. Regulatory Trends	186
1. Federal Regulations	186
2. State Regulations	187
C. Vendor Trends	190
1. Mergers, Acquisitions, and Strategic Partnering	190
2. VANS	191
a. Background	191
b. Problems	191
c. Trends	192
d. VAN Positioning	192

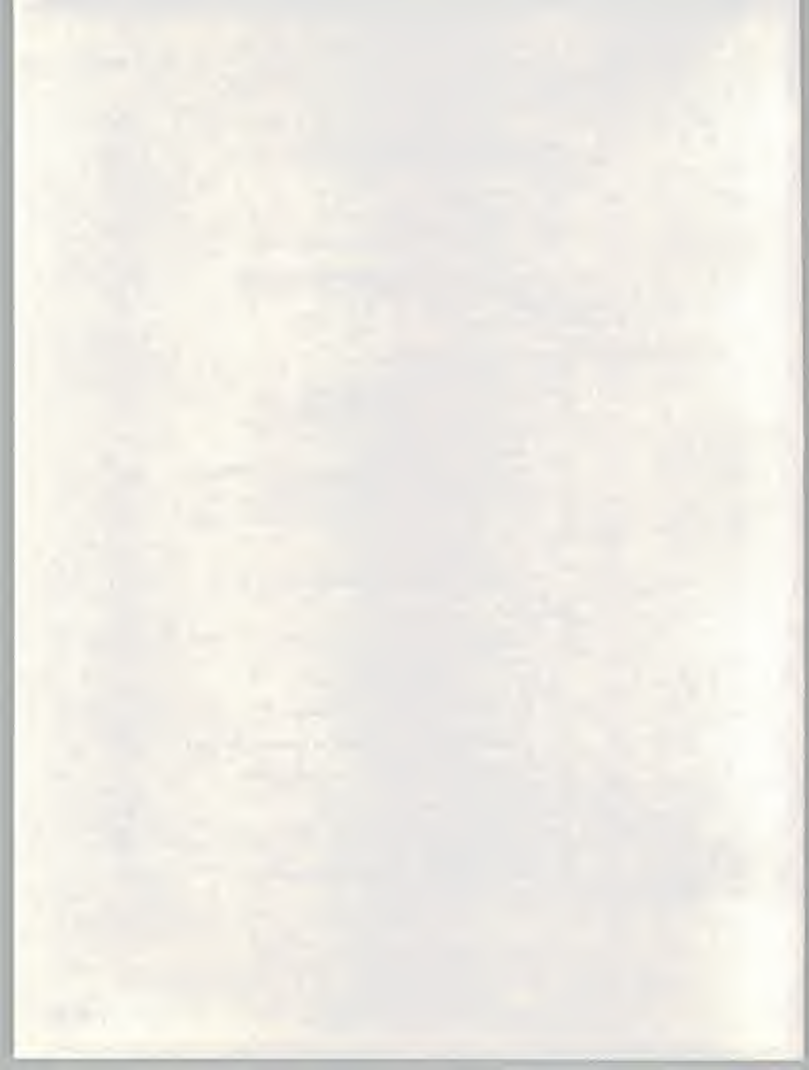




	<u>Page</u>
e. Creative Pricing	193
i. GTE Telenet's PC Pursuit	193
ii. GEISCO's GENie	194
f. Traffic/Revenue Growth and Profitability	194
g. The Opportunity in Private Networks	195
D. A Network Capacity Glut?	195
E. Application Trends	198
1. Voice Remains Dominant, Data Growing	198
2. Long-Distance Trends	201
3. On-Line Data Bases	203
a. Usage	203
b. A Trend in OLDB: Front-End Software and Services	203
c. CD-ROM Will Impact OLDB	205
4. Electronic Mail (E-mail)	207
a. Survey Findings	207
b. E-mail Directions	207
c. Teletex	209
d. Facsimile (FAX)	210
e. Voice Store and Forward (VSF)	211
5. Videotex	211
6. Micro-to-Mainframe and Network Services	214
7. Electronic Data Interchange (EDI)	216
a. EDI Defined	216
b. EDI Growth/Costs	217
c. EDI Service Vendors	217
d. Associations Taking a Leading Role	217
8. Video/Teleconferencing	220
9. Traditional Business Applications	221
10. Personal Communications	222
a. Paging	222
b. Portable Teletex	225
c. Field Service Messaging	225
d. Cellular Telephone	226
i. Industry Overview	226
ii. Roaming	226
iii. Long-Distance Services	227
iv. Mobile Data Applications	227
v. Value Added Cellular Services	228
vi. Airfone	229
vii. The Cellular Market	230
11. Voice Response/Speech Synthesis Network Applications	230
12. Telemarketing	232
13. Other Applications	233
F. Network Features Desired	234
1. VAN Internetworking	234
a. Current Status	234
b. A Useful Network Feature	235



	<u>Page</u>
2. Systems Network Architecture (SNA)	236
3. Bisynchronous Support	236
4. Outcall	236
5. Protocol Conversion	237
6. Error Correction	237
7. User Needs for Support	237
a. Maintenance, Installation, and Software Support	237
b. Hardware/Software Integration Assistance	239
c. Service Interruptions	239
G. Price Stability	242
H. Use of Consultants	243
I. Inclination to Change	245
J. International Telecommunications	246
1. INPUT's Research	246
2. U.S. Commerce Department Findings	247
a. International Voice/Messaging Demand	247
b. International Voice/Data Circuit Demand Trends	248
c. Wideband Circuit Demands	248
d. International Satellite Network Service Demand	249
e. International Virtual Private Networks	249
f. International Electronic Mail Demand	249
g. International Packet Switching Service Demands	249
3. International Record Carriers	250
a. What IRCs Provide	250
b. Diversification of Services	251
c. Changing Directions of Foreign PTTs	251
K. Industry Trends	252
1. Banking and Financial Services	253
a. Overview	253
b. Electronic Transaction Growth	254
c. Shared Financial Networks	256
d. Other Financial Services Networks	256
i. Mortgage Networks	256
ii. Securities Trading Networks	258
e. Technological Issues	258
f. Value Added Network Financial Services Forecast	259
g. Vendor Opportunities	261
h. Financial Institutions Are Partnering with Vendors	262
2. Transportation Industry	262
a. Railroads	263
b. Trucking	264
c. Ocean Shipping	265
d. Innovation in the Transportation Industry	265



	<u>Page</u>
3. Broadcasting	266
a. Microwave	266
b. Looking for Alternatives	267
c. Cable Television Directions	267
L. Government Market Sector Factors	268
1. State/Local Governments	268
a. California Is Representative	269
b. State Networks	269
c. Planning and Legislative Initiatives	270
d. Trends	271
2. Federal Government Network Services Directions	272
a. Overview	272
b. Market Size	273
c. FTS 2000 and WITS	275
d. Technical Trends	276
e. Network Services Usage	276
VI CASE STUDIES .....	279
A. An Electronics Company	279
B. A Company Plans to Develop and Sell An EDI Service	280
1. The Plan	280
2. Analysis	282
C. An Innovative Publisher	282
D. A Manufacturer Cuts Costs	284
E. A Farm Cooperative Looks to Satellite Services	285
VII CONCLUSIONS AND RECOMMENDATIONS .....	287
A. User Recommendations	287
1. Organizational Issues	287
2. ISDN Recommendations	288
3. Vendor Selection Criteria	288
4. Experiment	291
B. Concluding Remarks	291
APPENDIX A: DEFINITIONS OF RELEVANT TERMS.....	295
APPENDIX B: USER QUESTIONNAIRE .....	303
APPENDIX C: VENDOR QUESTIONNAIRE .....	313



## NETWORK SERVICES DIRECTIONS

### EXHIBITS

	<u>Page</u>
I    -1    Network Services Defined	2
-2    Interview Profile	6
II    -1    Users Were Confused	11
-2    Users Are Experimenting	13
-3    The Network Application Mix Is Changing	15
-4    The Market Is Consolidating	17
-5    The Network Services Market Is Growing	19
-6    Toward Adaptive Network Technology	21
-7    Recommendations to Network Service Users	23
III   -1    Pacific Bell's Victoria System	30
-2    Intra-LATA Network Services	37
-3    Inter-LATA Network Services	40
-4    Satellite Network Services Directions	52
-5    Hardware and Standards Directions/Impact	61
-6    Concept Illustration of An ISDN Network	68
-7    ISDN Timetable	69
-8    ISDN Distribution Services	72
-9    ISDN Directions/Issues	75
-10    Fiber Optics Directions	83
-11    FM SCA ("Subcarrier") Directions	88
-12    Emerging Network Directions	94
IV    -1    AT&T Communications	99
-2    Mainstream Network Service Vendors	141
-3    Types of Network Service Alliances	155
-4    DEC's Worldwide Network	157
V     -1    Views of the Network	172
-2    User Concerns	176
-3    Corporate Network Use	178
-4    Remote Office Links	181
-5    Bypass Directions	183
-6    Examples of New BOC Business	189
-7    Value Added Network Forecast--Processing/Network Services	196
-8    Corporate Network Proportions	199
-9    Corporate Networks' Image Elements Changing	200





	<u>Page</u>
-10 On-Line Data Base Services User Expenditure Forecast By Market Segment, 1985-1990	204
-11 Micro-to-Mainframe Configuration and External Communications	215
-12 EDI Market Growth, 1985-1990	218
-13 EDI Transaction Growth, 1985-1990	219
-14 Changes in Application Importance	223
-15 Cellular Radio Growth Users	231
-16 Network Services Feature Ratings	238
-17 Support Service Distribution--Network	240
-18 Average Number of System Interruptions Received-- Network	241
-19 Use of Consultants	244
-20 Forecast of U.S. Electronic Payments, 1983-2000	255
-21 Shared Financial Transaction Network Components	257
-22 Forecast of User Expenditures for Value Added Network Services for the Banking and Finance Industry, 1985-1990	260
-23 Federal Telecommunications Market, 1985-1990	274
VI -1 Case Study Summary	286
VII -1 Network Vendors Selection Matrix	290



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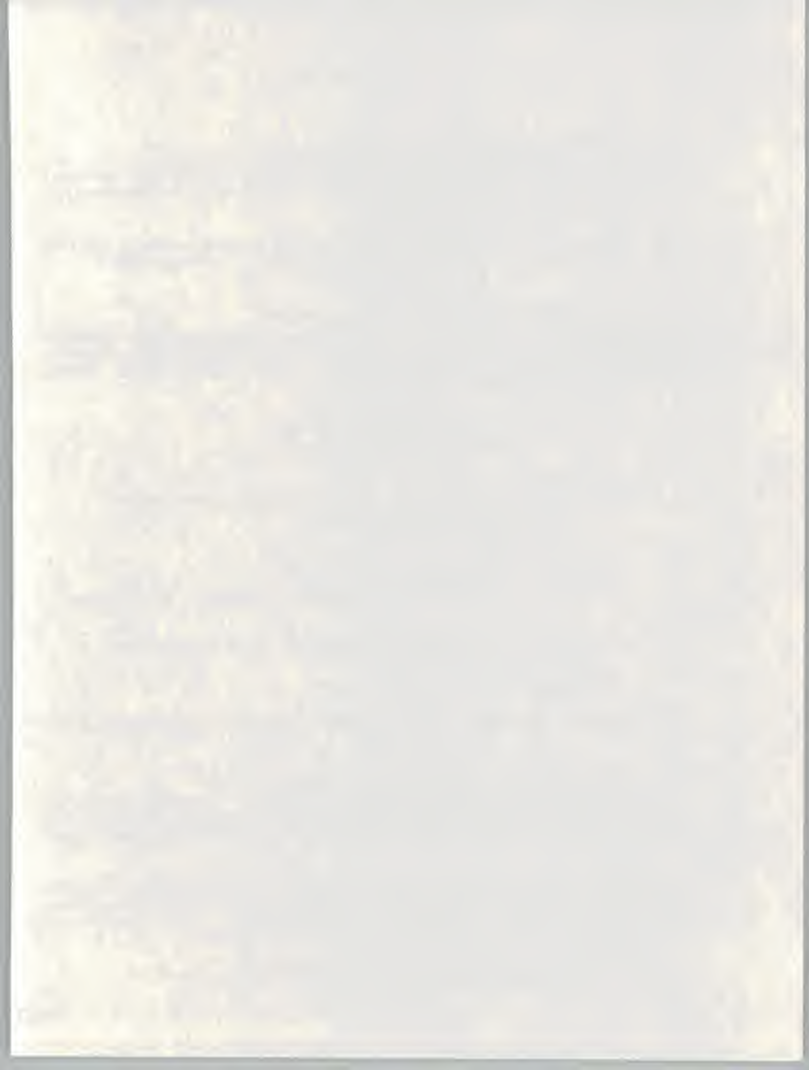
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